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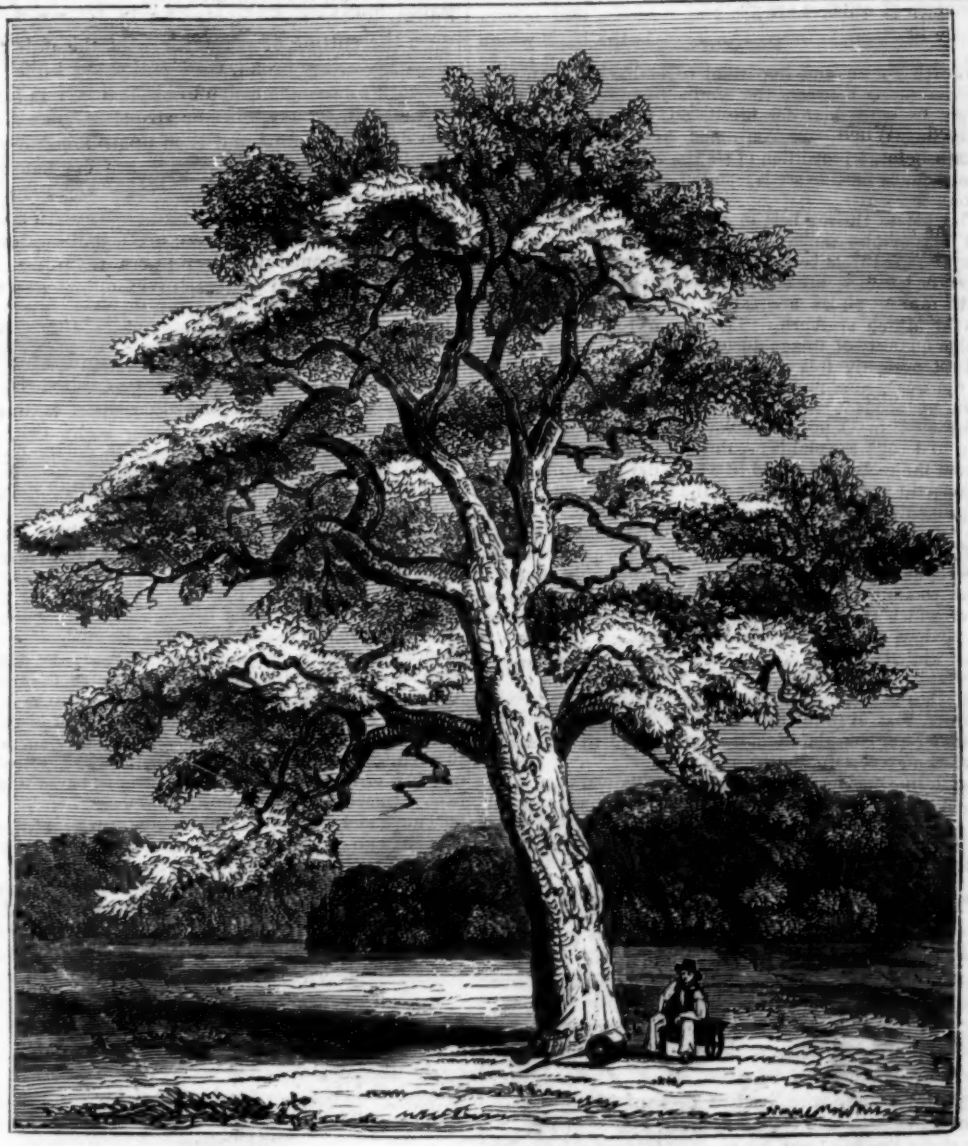
UNDER THE DIRECTION OF THE COMMITTEE OF GENERAL LITERATURE AND EDUCATION, APPOINTED BY THE SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE.



THE CORK TREE.

CORK, AND THE CORK TREE.

THAT most useful substance called Cork, is the thick, spongy, external bark, of a species of oak, the *Quercus suber*. The tree, of which there are two varieties,—namely, the broad-leaved, and the narrow-leaved, grows to the height of upwards of thirty feet, and is a native of some of the southern parts of France, of Spain, Portugal, Italy, and Barbary; it bears a strong resemblance to the evergreen oak, (*Quercus ilex*,) and attains to a great age. When arrived at a certain state of maturity, it sheds its bark naturally, but the quality of the bark so separated is inferior to that which is obtained by removing it at a proper period. The true cork is the produce of the broad-leaved tree, and the chief supply of it is obtained from Catalonia in Spain.

The bark of the Cork-tree, which is an evergreen, is rough and spongy on the trunk and main branches, smooth and gray on the smaller branches, and white and downy on the young shoots. The leaves are of a bright colour, oval-shaped, with indented edges; they are smooth on the upper, and downy on the under side. They grow alternately on the branches, on very rough, though strong footstalks; and, indeed, they differ very little from many forms of the *ilex*. The acorns of the Cork-tree are longish, smooth, and brown when ripe, and of the size and shape of some of our common acorns to which they are so much

alike, as when mixed together, not to be distinguishable. The Narrow-leaved Cork-tree is only a variety of the common sort.

The best cork of commerce is taken from the oldest trees, the bark of the young trees being too porous for use. They are, nevertheless, barked before they are twenty years old; and this first barking is necessary, to make way for the succession of a better, it being observable, that, after every stripping, the bark increases in value. The first crop is thin, hard, full of fissures, and consequently of little value. The cork is the bark which the tree pushes outwards, as is common to all trees; but in the Cork-tree, the outer bark is thicker and larger, and in greater quantity, and more easily removed. When removed, the *liber*, or inner bark, appears below it, and from this the cork is reproduced in the course of a few years. The trees are generally peeled over once in ten years.

In the collecting of cork, it is customary to slit it with a knife, at certain distances, in a perpendicular direction from the top of the tree to the bottom; and to make two incisions across, one near the top, and the other near the bottom, of the trunk. For the purpose of stripping off the bark, a curved knife, with a handle at each end, is used. Sometimes it is stripped in pieces the whole length, and sometimes in shorter pieces, cross cuts being made at certain intervals. In some instances, the perpendicular and transverse incisions are made, and the cork is left upon the trees, until, by the growth of the new bark beneath, it becomes sufficiently loose to be removed by the hand. After the pieces are detached, they are soaked in water, and when nearly dry are placed over a fire of coals, which blackens their external surface. By the latter operation, they are rendered smooth, and all the smaller blemishes are thereby concealed; the larger holes and cracks are filled up by the introduction of soot and dirt. They are next loaded with weights to make them even, and subsequently are dried and stacked, or packed in bales for exportation.

The uses of cork were well known to the ancients, and were nearly the same to which it is applied by us. Its elasticity renders it peculiarly serviceable for the stopping of vessels of different kinds, and thus preventing either the liquids therein contained from running out, or the external air from passing in. The use of cork for stopping glass bottles is generally considered to have been introduced about the fifteenth century. The practice of employing this substance for jackets to assist in swimming, is very ancient; and it has been applied in various ways towards the preservation of life when endangered by shipwreck.

The cork-jacket, revived from an old German discovery, to preserve the lives of persons in danger of drowning, is constructed as follows: Pieces of cork, about three inches long by two wide, and the usual thickness of the bark, are enclosed between two pieces of strong cloth or canvass, and formed like a jacket without sleeves; the pieces of cloth are sewed together round each piece of cork, to keep them in their proper situations; the lower part of the jacket, about the hips, is made like the same part of women's stays, to give freedom to the legs in swimming; it is made sufficiently large to fit a stout man, and is secured to the body by two or three strong straps sewed far back on each side, and tied before; the strings are thus placed, to enable any wearer to tighten it to his own convenience.

The floats of nets used for fishing are frequently made of cork. Pieces fastened together make buoys, which, by floating on the surface of the water, afford direction for vessels in harbours, rivers, and other places.

In some parts of Spain, it is customary to line the walls of houses with cork, which renders them warm, and prevents the admission of moisture. The ancient Egyptians frequently made coffins of it. On account of its lightness, cork is used for false legs; and from its being impervious to water, it is sometimes placed between the soles of shoes, to keep out moisture. When burnt, it constitutes that light black substance known by the name of *Spanish Black*.

In the cutting of corks for use, the only tool employed is a very broad, thin, and sharp knife; and, as the cork tends very much to blunt this, it is sharpened on a board, by one whet or stroke on each side, after every cut, and now and then upon a common whetstone. The corks for bottles are cut lengthwise of the bark, and consequently the pores lie across. Bungs, and corks of large size, are cut in a contrary direction: the pores in these are therefore downward, —a circumstance which renders them much more defective than the others, in stopping out the air. The parings of cork are carefully kept, and sold to the makers of Spanish black.

The importation of cork in a manufactured state, into this country is virtually prohibited by a very high duty; and the import duty upon it in a rough state is also considerable, being eight shillings per hundred weight. The price of cork, including the duty, varies according to its quality, from 20*l.* to 70*l.* per cwt.

The Cork-tree is rare in this country; that from which our engraving is taken, is in the garden of the Bishop of London's palace at Fulham.

IT is singular how beautifully the state and capabilities of inanimate nature, and the nature of man, are adapted to each other. How the devices and desires of our hearts are provided with a something whereupon to fix; how much is given that we could not create, but that we can assist, and mould, and form, and fashion, after our will, into those useful or exquisite shapes which our necessities demand, or our cultivated tastes teach us to consider beautiful. Enough is done for us to give us power, enough is left undone to give us employment; nor is it possible almost to arrive at that degree of improvement, that will forbid further hope. Nature herself crowns our best efforts with new and unlooked-for beauty, and we still trust, and justly so, that if our industry fail not, neither will her reward.

THE VISIBLE CREATION.

THE God of nature and of grace
In all his works appears;
His goodness through the earth we trace,
His grandeur in the spheres.

Behold this fair and fertile globe,
By him in wisdom plann'd;
'Twas He who girded, like a robe,
The ocean round the land.

Lift to the firmament your eye,
Thither His path pursue;
His glory, boundless as the sky,
O'erwhelms the wandering view.

The forests in His strength rejoice;
Hark! on the evening breeze,
As once of old, the Lord God's voice
Is heard among the trees.

His blessings fall in plenteous showers
Upon the lap of earth,
That teems with foliage, fruit, and flowers,
And rings with infant mirth.

If God hath made this world so fair,
Where sin and death abound;
How beautiful, beyond compare,
Will Paradise be found!—JAMES MONTGOMERY.

LUDOVICO CORNARO.

Ludovico Cornaro was a Venetian of noble family, whose history affords one of the most memorable instances on record of the effects of temperance and sobriety in prolonging life. He was born in 1467; and in his early youth, it appears, he was guilty of excesses, which brought on him many and grievous disorders, and rendered his existence precarious and miserable, from his thirty-fifth to his fortieth year. At that time, his physicians told him there was but one way left for the restoration of his health; and this was a regular and moderate way of living. Cornaro immediately entered on his new regimen; but, at first, he found it disagreeable, and wanted resolution to pursue it with steadiness. The return of his maladies, however, warned him that he could not trespass on his constitution with impunity; and, at length, he grew confirmed in a settled course of temperance, by which he was enabled to cast off all his maladies, and to attain the extraordinary age of ninety-eight years, in health of body, and serenity and cheerfulness of mind.

To give an idea of the small quantity of food on which Cornaro subsisted, we may mention what he records of himself, that, when he was seventy-eight years old, he was urged by the advice of his physicians, and the daily importunity of his friends, to add something to his usual stint and measure of food. He long resisted, urging the Italian proverb, 'He that will eat much, let him eat little;—because, by eating little, he will prolong his life.' However, he says, "To avoid obstinacy, and to gratify my friends, at length I yielded, and permitted the quantity of my meat to be increased, yet two ounces only. For, whereas, before, the measure of my whole day's meat, namely, my bread, and eggs, and flesh, and broth, was twelve ounces exactly weighed, I increased the quantity two ounces more; and the measure of my drink, which was before fourteen ounces, I made sixteen. This addition," he goes on to say, "wrought so much upon me, that from a cheerful and merry man, I became melancholy and choleric, so that all things were troublesome to me; neither did I know what I did or said. On the twelfth day, a pain in the side took me, which held me two and twenty hours. On the back of it came a terrible fever, which continued thirty-five days and nights; although, after the fifteenth day it became less and less; besides all this, I could not sleep, no not for a quarter of an hour; whereat all gave me for dead. Nevertheless, I, by the grace of God, cured myself only by returning to my former course of diet; although I was now seventy-eight years old, and my body spent with extreme leanness, and the season of the year was winter and most cold air: and I am confident that, under God, nothing holp me but that exact rule, which I had so long continued."

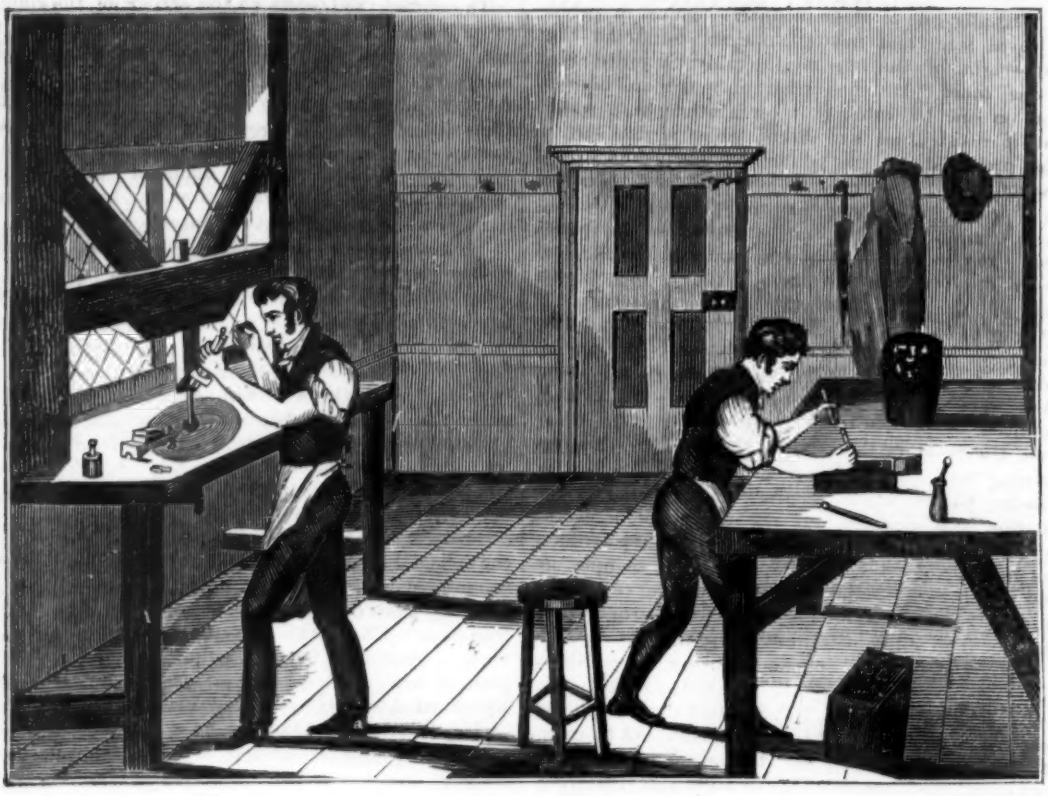
To show what a security a life of temperence is against the ill effects of hurts and disasters, Cornaro relates an accident which befell him when he was very old. One day, being overturned in his chariot, he was dragged by the horses a considerable way upon the ground. His head, his arms, his whole body, were very much bruised, and one of his ancles was put out of joint. He was carried home; and the physicians, seeing how much he was injured, considered it impossible that he should live three days; but, by bleeding and evacuating medicines, he presently recovered his health and strength.

It is well worthy of observation that the extreme abstemiousness of Cornaro had not, in the least degree, the effect of rendering him morose or melancholy. On the contrary, no man seems more to have enjoyed the innocent pleasures of life. He says of himself, "I am ever cheerful, merry, and well-contented, free from all troubles and troublesome thoughts, in whose place joy and peace have taken up their standing in my heart. I am not weary of life, which I pass in great delight. I confer with worthy men, excellent in wit, learning, behaviour, and other virtues. When I cannot have their company, I give myself to the reading of some learned book, and afterwards to writing, making my aim in all things how I may help others to the farthest of my powers." He prided himself on having such a portion of life and spirit left within him, that at the age of eighty-three he wrote a comedy "full of innocent mirth and pleasantry." He mentions his excursions for the sake of seeing his friends, and of conversing with the adepts in all arts and sciences,—architects, painters, statuaries, musicians, and even husbandmen. He speaks with great complacency of his visits to his various residences, and of his taste and skill in improving them. Of one of these residences, in particular, he says, "At other times, I repair to a villa of mine, seated in the valley: which is, therefore, very pleasant, because many roads thither are so ordered, that they all meet and end in one fair spot of ground, in the midst whereof is a church suitable to the condition of the place. This place is washed by the river Brenta, on both sides whereof are great and fruitful fields, well manured, and adorned with many habitations. In former times it was not so, because the place was moorish and unhealthy, fitter for beasts than men; but I drained the ground, and made the air good: whereupon men flocked thither, and built houses with happy success. By this means the place is come to the perfection that we now see it is;—so that I can truly say that I have both given God a temple, and men to worship him in it; the memory whereof is exceeding delightful to me." And in another place, he says of himself, "That no pleasure may be wanting to my old age, I please myself daily with contemplating that immortality, which I think I see in the succession of my posterity. For every time I return home, I meet eleven grandchildren, all the offspring of one father and mother; all in fine health; all, as far as I can discern, apt to learn, and of good behaviour. I am often amused with their singing; nay, I often sing with them, because my voice is louder and clearer now than ever it was in my life before. These are the delights and comforts of my old age; from which, I presume, it appears that the life I spend is not a dead, morose, and melancholy life; but a living, active, pleasant life, which I would not exchange with the robustest of those youths who indulge and riot in all the luxury of the senses, because I know them to be exposed to a thousand diseases, and a thousand kinds of death."

These extracts are taken from several discourses by Cornaro on the advantages of a temperate life; the last of which,—containing a lively description of the health, vigour, and perfect use of his senses, which he had the happiness of enjoying at so advanced a period of life,—he wrote at the age of ninety-one. This virtuous and happy old man at length expired without pain, by a gradual decay of nature, April 26th, 1566, aged ninety-eight. One of his discourses has been rendered into English by our excellent George Herbert; and there is a short, but pleasing account of him in the 195th number of the *Spectator*.

C.

As daylight can be seen through small holes, so do little things show a person's character.—Drew.



CUTTING AND POLISHING THE DIAMOND.

THE DIAMOND.

THE diamond is the hardest and most valuable of the precious stones, and for many years was considered indestructible by fire, or any other means: modern chemistry, however, has proved that at a heat rather below that required to melt silver it is gradually dissipated, or burnt. When the product of this combustion was examined, it was found to be precisely similar to that produced by the destruction of a piece of charcoal, of equal size, by the same means. The same principle, therefore, namely, a small quantity of the gas called *carbon*, which when in an aëriform state destroys life, produces, when acted upon in different ways in the great laboratory of nature, two substances so perfectly unlike each other as charcoal and the diamond,—the one consumed as fuel, and the other prized at so high a rate as to be purchased for sums of money equal to princely fortunes.

In former times, all the diamonds that were known were brought from different parts of India, particularly from the famous mines of Golconda, near Hyderabad, the present capital of the Deccan, in Hindostan; the Islands of Molucca and Borneo have also produced many valuable stones: they are always found in an alluvial soil, generally gravel, resting on granite, and not imbedded in any other substance, but appearing like small pebbles with the surface flattened in many parts.

The diamond mines of Golconda are now so far exhausted, as to be considered not worth the expense of working. The diamonds which are now brought to Europe are chiefly from the Brazils.

When Brazilian diamonds were first imported, the circumstance excited the jealousy of the dealers in East Indian gems, and a prejudice was unjustly raised against the produce of these newly-discovered mines; and although subsequent trials have proved the diamonds of Brazil to be fully equal to those of the East, so difficult is it to remove a prejudice when once it is raised, that to the present day the diamonds of Brazil are considered by some people to be of an inferior kind. In the first instance, the feeling was so strong, that in order to obtain a fair price for their stones, the merchants of Brazil were in the habit of sending their cargo in the first instance to Goa, that it might be re-imported from that place into Europe, as the production of the eastern world. Formerly, nearly the whole of the trade in diamonds was monopolized by the Dutch, and at present the cutting and polishing of these gems is in general performed in Holland, on account of the lower price of labour; but the English workman is nevertheless considered much superior. The manner of the discovery of diamonds in Brazil may be considered a very remarkable event.

"About a century ago, that part of Brazil called Serro de Frio was explored for gold, and in searching for this precious metal, some singular substances, resembling pebbles, were occasionally met with, in regular geometric forms. The peculiar hue and lustre of some particular specimens attracted the notice of the negroes, who showed them to their masters, as pretty shining pebbles. When met with they were preserved, and gradually came into fashion, as counters, in playing at cards.

"In this state the gems remained for some time, until an officer arrived, who had been in India, and was reputed to be a great mathematician. At the social parties which he visited these pretty counters attracted his notice. Having obtained some, he examined them more minutely when alone, and was particularly struck with their geometrical symmetry of form. He compared them with common pebbles of the same bulk, to which he found they bore no resemblance.

"The officer already mentioned conceived the idea

of weighing one of these counters against a pebble of equal size, and having done so, he found that the weight of the one considerably exceeded that of the other. He then tried to make an impression on one by rubbing it on a stone with water, but it resisted all his efforts, while a flat surface was produced on the pebble by the labour of a few minutes. He sent a handful of these counters by a friend, to Lisbon, for the purpose of having them examined; these were given to the lapidaries (who never work diamonds, and, perhaps, had never seen one in its native state); they could only say the stones were too hard for their tools. At length, by mere accident, the Dutch consul saw them, and gave his opinion that they were diamonds. Some were immediately forwarded to Holland, where they were manufactured into brilliants, and pronounced to be diamonds equal in quality to those from Golconda or any other part of India. The returning fleet carried this favourable news to Rio de Janeiro, whence it was rapidly communicated to the interior, and fortunate was the man who could procure a large share of these hitherto pretty pebbles, but now diamonds. They were quickly bought up, and the counters which had for a year or two been carelessly handed about, became the property of three or four individuals in as many days."

The art of cutting, splitting, sawing, or polishing diamonds requires great skill, practice, and patience. "It is seldom," says Mr. Mawe, "that the same workman is a proficient in all these branches, but he generally confines himself to one. In cutting and polishing a diamond, the workman has two objects in view; first, to remove any flaws or imperfections that may exist in the stone, and secondly, to divide its surface into a number of regularly-shaped polygons. The removal of flaws seems to be the most material object, since the smallest speck in some particular parts of the stone is infinitely multiplied by reflection from the numerous polished surfaces of the gem.

"When the shape of the rough stone is particularly unfavourable, the workman has to resort to the hazardous operation of splitting. The rule by which the proper place is discovered at which to apply the requisite force is made a great mystery of: but, perhaps, like many other mechanical arts, it depends as much on the dexterity acquired by constant practice, as on scientific knowledge; and in that case the workman himself, although a perfect adept in his business, would find himself unable to impart the knowledge he was in possession of.

"When the direction in which it is to be split is decided on, it is marked by a line cut with a *sharp* *: the stone is afterwards fixed by strong cement in the proper position in a stick, and then by the application of a *splitting-knife*, the section is effected by the application of a smart blow."

Sometimes, when the section must cross the crystallized structure of the gem, recourse must be had to *sawing*; this is performed as follows.

The diamond is cemented to a small block of wood which is fixed firmly to a table, and a line is made with a sharp where the division is intended to take place, which is afterwards filled with diamond-powder and olive-oil: the sawing is then commenced, and if the stone is large, the labour of eight or ten months is sometimes required to complete the operation. The saw is made of fine brass or iron-wire, attached to the two ends of a piece of cane or whalebone, the teeth being formed by the particles of diamond-powder, which become imbedded in the wire as soon as it is applied to the line.

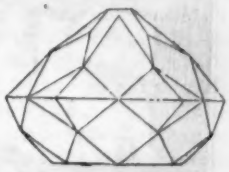
* When a small diamond is broken into four parts, the edge of each quarter is called a *sharp*.

The cutting the facets on the surface of the rough stone is a work of labour and skill; the polishing is performed in a mill, which is an extremely simple machine.

Diamonds are cut (generally on account of the shape of the rough stone) in various ways, and assume different names in consequence; as a brilliant, a rose, a table, and a lasque diamond: of these the brilliant is the most splendid, from the brilliancy and number of its reflections and refractions.

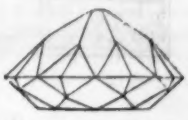
We shall close this article with an account of some of the largest known diamonds.

The Pitt, or Regent Diamond, is said to have been found in Malacca; it was purchased by Thomas Pitt, Esq.†, when governor of St. George, in the East Indies, in the reign of Queen Anne, for 20,400*l.*, and weighed, when raw, 410 carats‡, and when cut 136½ carats. It was brought to London, cut as a brilliant, and sold to the Duke of Orleans for the King of France, in 1717, for 135,000*l.*; 5000*l.* were spent in the negotiation, &c., the cutting occupied two years, and is said to have cost 3000*l.*; the fragments were worth several thousands, and the diamond has since been valued at 400,000*l.* Buonaparte placed it in the hilt of his sword. It is still preserved among the jewels of France.



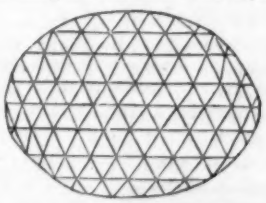
THE PITT, OR REGENT DIAMOND.

The Pigott Diamond weighs 49 carats, and is valued at 40,000*l.* About twenty years ago it was disposed of by lottery, and became the property of a young man, who sold it at a low price. It is said to have been lately sold to the Pacha of Egypt for 30,000*l.*

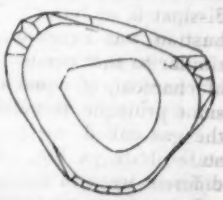


THE PIGOTT DIAMOND.

The Austrian Diamond weighs above 139½ carats. It belongs to the Emperor of Austria, and was formerly in the possession of the Grand Duke of Tuscany.



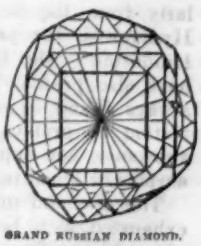
THE AUSTRIAN DIAMOND.



THE NASSUC DIAMOND.

The Nassuc Diamond weighs 79 carats 2 grains. It was among the spoils taken during the Mahratta war, and is valued at 30,000*l.* It is a diamond of great purity, but of bad form.

The Grand Russian Diamond is said to have been the eye of an Indian idol, and to have been stolen from thence by a French, some say an Irish, soldier, who sold it to the captain of a ship for 2000*l.*, and the captain again disposed of it in Europe for 20,000*l.* At length it fell into the hands of a merchant, who sold it to Prince Orloff, for the late Empress of Russia, Catherine, for 90,000*l.* in cash, an annuity of 4000*l.*, and a patent of nobility. Its weight is 193 carats.



GRAND RUSSIAN DIAMOND.

[We are indebted for great part of the information contained in this account, to Mr. MAWE'S curious *Treatise on Diamonds and Precious Stones.*]

† Grandfather of the first and immortal Earl of Chatham.

‡ A carat is equal to four grains.

FAMILIAR ILLUSTRATIONS OF NATURAL PHENOMENA.

No. XV. WATER IN THE STATE OF VAPOUR.

WE are so accustomed to see water in a sensible form, either fluid or solid, as in rain, ice, hail, snow, fog, and the like, that every one is surprised when he is made conscious, for the first time, that water may really be found in the condition of a perfectly invisible vapour. Yet, whoever has seen a bottle brought out of a cellar in a warm day, or observed the effect produced, when the windows of a carriage are first drawn up, and particularly persons wearing spectacles, the glasses of which are suddenly dimmed by steam upon entering a heated room, must have noticed enough to convince him that such is the case. In such instances, the colder surface of the glass *condenses* the vapour of water, previously invisible in the atmosphere, and thereby renders it sensible. All the great changes of sunshine, cloud, and storm,—the various hues of the rising and setting sun,—the halos which occasionally surround the sun and moon,—are all influenced or occasioned by the vapour of water diffused throughout the atmosphere.

The vapour of water, however, in its simplest form, is perfectly invisible. It exists, as we have seen in a previous number*, mixed with the other gaseous matters which compose the atmosphere, and diffused over all parts of the earth's surface. Every substance which contains water is capable also of permitting it to evaporate. Not only large masses of water, as seas, lakes, and rivers, as well as ice, but every portion of vegetation, all soils, even those which appear the driest, are continually permitting some portion of watery vapour to escape from them. The quantity of vapour in the atmosphere at any given time is influenced by a variety of causes; but the *presence* of such a vapour is most important for many purposes. Dew, which is formed by the condensation of the vapour of water upon the leaves and other parts of plants†, affords nourishment to vegetation when no rain falls; and a certain quantity of vapour of water is essential to the health of man. In some hospitals, when they were first warmed by heated air, it was found that the inmates suffered from their skin cracking and peeling off, as in very hot climates; but the inconvenience was immediately removed, when vessels of water were placed in several parts of the building, which, by evaporation, supplied the requisite quantity of moisture to the air.

The quantity of evaporation going on constantly is far greater than is usually conceived. In a hard frost, a lump of ice or snow will be observed sensibly to diminish, especially if a brisk wind is blowing over it. This is quite independent of the wasting of the frozen substance by thawing. In fact, snow or ice may totally disappear, without any perceptible thaw, simply by evaporation. It has been computed, from actual experiment, that an acre of snow evaporates *four thousand gallons* of water in twenty-four hours. All plants exhale vapour; and some much more than others. Thorn hedges exhale seven times as much as those of holly; and a cabbage perspires six or seven times as much as a man from the same quantity of surface.

There is, however, a limit to the power of evaporation; and this limit is fixed by the temperature of the climate. We are very imperfectly acquainted with all the causes which occasion the difference of temperature in different places: but we know that there are certain extremes both of cold and heat which are not surpassed. Now the quantity of evaporation depends upon the temperature; so that if, on the coldest day of winter, the air contains as much moisture as possible, or is, as it is called, *saturated* with vapour, it can then receive no more vapour, unless its temperature is increased. But as the temperature of the air increases, more and more vapour may be mixed with it; yet still, as the heat of the air never exceeds a certain degree, the quantity of vapour also is limited.

Such a limitation is quite necessary for the well-being of all plants and animals: either a perfectly dry air, or an atmosphere which was overcharged with vapour, would be inconsistent with their existence in a state of health. As the atmosphere is now constituted, there is found in every part a certain quantity of vapour, ready to make its presence sensible whenever any change of circumstances causes it to be condensed.

One of the most common effects thus produced is that of clouds. The well-known experiment, mentioned above, of the condensation of vapour on a cold surface, such as glass, shows that if the temperature of the air be by any means lowered, the quantity of moisture which it will retain in the state of invisible vapour will be diminished. In cold weather, this is made very evident by the condensation of the breath of animals. The air, which comes from the lungs, contains with it a quantity of watery vapour, which would be quite invisible if it were breathed out into an atmosphere of the same or nearly the same temperature as that of the animal's body. But when the air is much colder, some of the vapour is instantly condensed, and forms very small drops. The same effect is seen on a large scale when the steam is discharged from a steam-engine. Where, then, any change takes place in the temperature of the atmosphere, from any cause, there is a probability that the vapour in the atmosphere will be condensed, and become visible.

Thus, suppose the air perfectly serene and clear, and that it contains in every part just as much vapour as it is then capable of containing. If a stream of colder air be now made to pass through a part of this atmosphere, the temperature of the two portions of air when united will be lower than that of the first portion was before, and the vapour in it will be partially condensed, forming a cloud of greater or less density according to circumstances.

If the condensation goes on, the very small particles of water,—which float in the atmosphere, or, after descending a little way, meet with a warmer temperature and are again turned into invisible vapour,—will unite in drops of a sensible magnitude and fall in *rain*. Should they meet with a still greater degree of cold, the drops freeze in their descent, and appear as *hail:* or, if the congelation takes place while the particles of water are still very small, *snow* or *sleet* will be formed.

By the same means all the different appearances of fog and mist are occasioned. During the heat of a summer's day, evaporation goes on with great rapidity, as has been already noticed, from water, from all vegetable bodies, and even from the earth. But, at sunset, heat begins to be lost by radiation, and some of the vapour is immediately perceptible, especially where evaporation has been most copious, as along a river, or over meadows. The course of a river may sometimes be distinctly traced for a long distance, even when the water itself is not visible, by the fine cloud formed by such congelation.

On the other hand, when the atmosphere is charged with visible moisture, an increase of heat converts the water into invisible vapour. A very beautiful

* See *Saturday Magazine*, Vol. V., pp. 103, 149, 236.
† Ibid. Vol. IV., p. 117.

instance of this effect is often seen in Autumn. At sunrise, the whole atmosphere appears full of floating particles of water, forming a dense mist, the minute drops of which are distinctly visible. As the sun rises above the horizon, the air is gradually warmed: the fog begins to disperse, at first rising a little into the forms of clouds, but soon totally disappearing.

The causes which occasion many of the changes of water from the state of vapour to a visible form, and the converse, are not well understood. Electrical agency appears to be very active; and there are probably many other causes. But what is here stated may be enough to show how many beneficial consequences flow from the wise provision which is made for the extensive diffusion of water in the state of vapour. C.

THERE is nothing in history which is so improving to the reader, as those accounts which we meet with of the deaths of eminent persons, and of their behaviour in that dreadful season. I may also add, that there are no parts in history which affect and please the reader in so sensible a manner. The reason I take to be this, because there is no other single circumstance in the story of any person which can possibly be the case of every one who reads it. A battle or a triumph are conjunctures in which not one man in a million is likely to be engaged; but when we see a person at the point of death, we cannot forbear being attentive to every thing he says or does, because we are sure that, some time or other, we shall ourselves be in the same melancholy circumstances. The general, the statesman, or the philosopher, are perhaps characters which we may never act in; but the dying man is one whom, sooner or later, we shall certainly resemble.—ADDISON.

LET us at all times cherish in our minds an unrelaxing certainty, that we shall always find the Almighty perfect in his justice to us all, and in everything, and individually to each of us, as soon as we obtain sufficient knowledge of his operations with respect to us. Let us wait with patience until what we do not perceive or cannot comprehend shall be satisfactorily elucidated to us. We expect this equity and consideration in our intercourse with each other. Let us also so conduct ourselves, in all our thoughts and feelings with reference to Him, whatever may be his present or future dispensations personally to ourselves.—TURNER.

INSENSIBILITY, in return for acts of seeming, even of real, unkindness, is not required of us. But whilst we feel for such acts, let our feelings be tempered with forbearance and kindness. Let not the sense of our own sufferings render us peevish and morose. Let not our sense of neglect on the part of others induce us to judge of them with harshness and severity. Let us be indulgent and compassionate towards them. Let us seek for apologies for their conduct. Let us be forward in endeavouring to excuse them. And if, in the end, we must condemn them, let us look for the cause of their delinquency, less in a defect of kind intention, than in the weakness and errors of human nature. He who knoweth of what we are made, and hath learned, by what he himself suffered, the weakness and frailty of our nature, hath thus taught us to make compassionate allowances for our brethren, in consideration of its manifold infirmities.—BISHOP MANT.

No obligation to justice does force a man to be cruel, or to use the sharpest sentence. A just man does justice to every man and to every thing; and then, if he be also wise, he knows there is a debt of mercy and compassion due to the infirmities of man's nature; and that is to be paid: and he that is cruel and ungentle to a sinning person, and does the worst to him, dies in his debt and is unjust. Pity, and forbearance, and long-sufferance, and fair interpretation, and excusing our brother, and taking in the best sense, and passing the gentlest sentence, are as certainly our duty, and owing to every person that does offend and can repent, as calling to account can be owing to the law, and are first to be paid; and he that does not so is an unjust person.—JEREMY TAYLOR.

THE USEFUL ARTS. No. VI.

SPICES AND OTHER CONDIMENTS.

THE term *spices* is applied to certain vegetable products which are highly aromatic, or pungent, or both. In all ages, they have been much prized, and the earliest commercial intercourse, of which we have any record, was chiefly carried on for the sake of these commodities. It was not solely as condiments to food that they were sought after; spices were extensively used in religious rites and in funeral ceremonies.

CINNAMON is the bark of a species of Laurel (*Laurus Cinnamomum*) which grows in the south of the Indian Peninsula, but abundantly only in the Island of Ceylon, where it is extensively cultivated. Upwards of 400,000 pounds of this valuable produce are annually exported to Europe, and more than 25,000 persons, it is said, are engaged in Ceylon, either in the culture, or in the harvest. The tree attains a height of from twenty to thirty feet, with narrow leaves of a dark green on the upper, but lighter on the under side. It blossoms in January*. The flowers are fragrant, white, resembling, in size and form, those of the Lilac; they are borne in clusters on long stalks springing from the axilla of the leaves. The fruit is a small berry, which becomes, when it is ripe, a thin shell containing a single seed. The plant sends up numerous suckers the third or fourth year after it has been planted. These shoots are cut when they become from half to three-quarters of an inch in diameter: the bark is stripped off and is freed from the outermost skin or epidermis; the wood is used only for fuel.

MACE and NUTMEG. The Nutmeg is the seed of the *Myristica moschata*, and Mace is a soft fleshy coat enveloping the seed; this coat is of a bright crimson colour, and as the fruit opens when it is ripe, the appearance of it on the tree is extremely pleasing. The plant is a native of the East Indian Archipelago; it is *diœcious*, and resembles the Laurel in its appearance. The seed has an outer skin of a black colour, which is easily detached, when the seed is quite dry; artificial heat is employed to accelerate this object, and to *kill* the vegetative power. The nutmeg yields, by pressure, an oil used in medicine.

CLOVES are the dried flower-buds of the *Caryophyllus aromaticus*, a large handsome tree of the myrtle tribe, and a native also of the East Indian Archipelago. They are beaten from the tree when the *calix*, or cup, expands, but before the petals open; the former organ is easily recognised in the spice, and the central round knob consists of the unexpanded petals, and not of the fruit, as is erroneously supposed. Upwards of 50,000 lbs. are annually consumed in Britain. Cloves yield abundance of essential oil, of a strong pungent aromatic flavour, to which that of the spice is due. This oil is extracted either from the fresh-gathered buds by pressure or by distillation: it is used in medicine.

ALLSPICE derives its name from its scent and flavour being supposed to embody those of several others, and for which it might be substituted. Allspice is the dried unripe berry of a tree, a species of myrtle, which is a native of both the East and West Indies. The plant is known by the name of Pimento, or Jamaica Pepper.

PEPPER is a generic name of several different productions. *Black* and *White Pepper* are the dried seeds, ground to powder, of the *Piper nigrum*, a creeping plant of the equinoctial regions of Asia and America. The two spices only differ in the latter being blanched by soaking in water, and having the black skin rubbed off; but a great deal of White Pepper consists only of the inferior shrivelled seeds, which, falling from the tree, have been blanched by exposure to the air and sun. Long Pepper is only a variety of the common Pepper-tree, the racemes of the fruit being closer, and are imported whole.

CAYENNE PEPPER is made by grinding the dried fruit of the *Capsicum baccatum*, or Bird-Pepper, a native of both Indies. The fruit is a small fleshy capsule, of a brilliant scarlet, and of intense pungency, as every one knows from the pepper in question. There is a kind producing very small species, known by the name of *chilies*, which is the strongest in its perfect state, and which forms an important ingredient in West India pickle. Though it is the fruit which is used for making Cayenne pepper, yet the seeds are equally, if not more, pungent. The plant is

* That is, a little after Midsummer, the country being in the Southern hemisphere.

common in our green and hot-houses, and even in this climate the fruit is perfected, and is little inferior to that imported.

It should be mentioned, that though so powerful a stimulant, Cayenne pepper is considered more wholesome than the common black pepper.

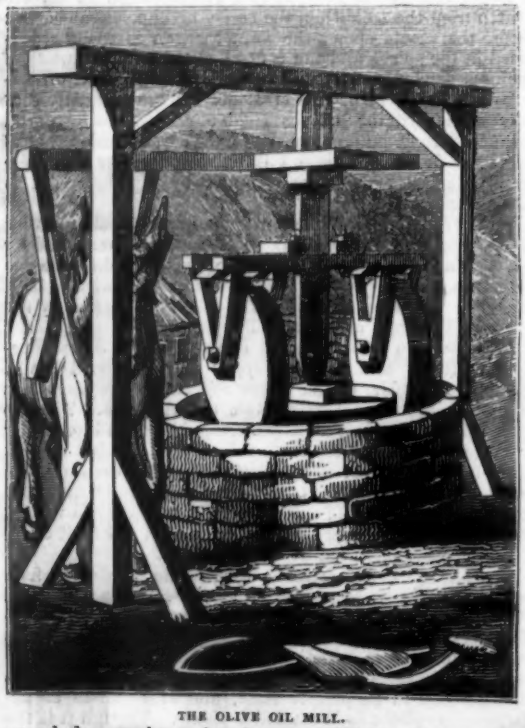
GINGER is the woody root of the *Zingiber officinalis*, a native of south-eastern Asia and the adjoining islands, and long since cultivated in the West Indies. The plant is nearly allied to the arrow-root tribe, and somewhat resembles the Indian-shot. The roots are sorted, washed, scraped, and dried in the sun. The young roots make an excellent preserve, and a great deal is imported in that state. Ginger is a valuable medicine, and is as wholesome as so powerful a stimulant can be.

MUSTARD is an infusion of the seeds ground to powder of the *Sinapis nigra*, an indigenous plant, but also cultivated for the purpose. On the Continent it is usual to mix tarragon and several other herbs with mustard to flavour it; here it is generally only prepared with a little salt and water, and perhaps some vinegar. It is an extremely wholesome condiment, and is also a most valuable medicine; the whole seeds have lately been used as such, and an infusion of the powdered mustard in hot water is a speedy and safe emetic. It is also used when applied externally in the form of a plaster, to excite inflammation.

OILS are a most important class of vegetable, as well as animal, fluids. Vegetable oils are of two kinds,—*fixed* and *volatile*, easily distinguished by the following obvious characters: if a piece of paper be moistened with a fixed oil, it becomes more transparent, or what we call *greasy*, and never again loses that quality; whereas if a volatile oil be used in the same way, it dries up entirely after a time, leaving no trace behind it. The volatile oils are extremely numerous; it is to them that most parts of plants owe their aroma, fragrance, pungency, and other properties affecting the taste and smell.

Fixed oils are obtained principally from the seeds by pressure. The only one that we have to notice here is

OLIVE OIL. The Olive *(Olea Europea)* is extensively cultivated in the south of Europe, solely for the sake of the oil which is obtained from its *fruit*. This is a small green oval berry, containing a hard stone in which are two seeds. The fruit must be gathered a little before it is quite ripe; the olives are spread on the floor of a room, and left for



THE OLIVE OIL MILL.

several days to dry and to ferment slightly: they are then crushed in a mill and the mass put into bags made of rushes or of coarse canvass, which being subjected to pressure in a screw press, the oil flows out and is received into proper vessels, which are half filled with water, on the top of which the oil floats and is easily skimmed off.

Where the process is carefully performed, the stone of the berry is not broken when the fruit is first put into the mill, the mill-stones being set wide enough apart to avoid doing so, and the oil first drawn off is of superior quality. After all this is expressed, the mass, stones and all, is either returned to the mill and the stones are broken, or the same effect is produced by mixing up the mass with boiling water and increasing the power of the press; by repeating this operation, not only a second, but even a third quality of oil is obtained.

The best oil is made in the neighbourhood of Aix, in France; that consumed in England is produced principally in Tuscany or the kingdom of Naples, though a great deal is also brought from Spain, and some from the Ionian islands. In our country, as an article of food, it is only a luxury used by the middling and upper classes, and the quantity consumed, therefore, is not great; about 5000 tons annually being the average, of which a considerable quantity is required in the woollen manufactures, and other arts; but in the countries which produce the olive, the oil constitutes a large proportion, in some way or other, of the food of the people, and is an absolute necessary. Olive oil is also employed to burn in lamps, an application of it which is forbidden by law in this country. To fit it for this latter use, the oil of the inferior quality is mingled with about a fiftieth part in weight of strong sulphuric acid, and water being added, the whole is well stirred together: in a few days a sediment of a charcoal settles to the bottom, and the oil is decanted off clear.

The refuse of olives, after all the oil is obtained from it, is given to hogs to fatten them, is burnt as fuel, or used as a manure. The unripe fruit is also pickled in salt-water flavoured with some spice, and is eaten after dinner by many persons in Britain, but much more abundantly on the Continent, to improve the flavour of certain wines.

In other countries, many other oils besides that of the olive are used for food; as for example, nut-oil, the oil of the filbert and of the beech; poppy-oil, rape-seed oil, oil of sesamum, and many others. Several of these are used in the arts in England, and will be subsequently noticed.

MUSTARD SEED.—"A grain of mustard seed" is said in the parable to be "the smallest of all seeds; but when it is grown up, it is the greatest among herbs, and becometh a tree, so that the birds of the air come and lodge in the branches thereof." The mustard of our own country is very far from answering this description: but there is in the East a species of *sinapi*, to which it, no doubt, alludes: it is called by Linnæus *Sinapi crucoides*. Its branches are real wood, as appears from a specimen once in the collection of Sir Joseph Banks. Lightfoot, Buxtorf, and others, quote the Jewish Rabbies to the same effect, whose testimony cannot be suspected of partiality to the New Testament. In the *Talmud of Jerusalem* it is said, "There was in Sichi a mustard-tree, which had three branches, one of which, being cut down, served to cover the hovel of a potter; and yielded three *cabs* of seed." The Rabbi Simeon says, "he had in his garden a shoot of the mustard-tree, on which he climbed as if on a fig-tree." These statements are, at least, sufficient to show that we should not form a judgment of eastern herbs by those which are familiar among ourselves.

WISDOM and knowledge do not always go together. There may be wisdom without knowledge, and knowledge without wisdom. A man without knowledge, if he walk humbly with his God, and live in charity with his neighbours, may be wise unto salvation. A man without wisdom may not find his knowledge avail him quite so well. But it is he who possesses both that is the true philosopher. The more he knows, the more he is desirous of knowing; and yet the farther he advances in knowledge, the better he understands how little he can attain, and the more deeply he feels that God alone can satisfy the infinite desires of an immortal soul. To understand this is the height and perfection of philosophy.—*The Doctor.*

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